

Work Order ID 58501

May 7, 2010 2:26:59 PM



Page 1

Item ID: D205-634-041

Accept



Setup Start



Revision ID:

Item Name: Replacement Skidtube

Stop



Start Date: 07/05/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 24/05/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

PL

Date: 10-5-07

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start



Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D2580

Rev D

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy D205-634 bluefile & type labels per PPP D205-634-041 CHG002

8/10/05/31

HJ for BG 10/05/31

110

0.00



BENDING MACHINE - SKIDTUBES

CNC Bend 1

Memo

0.00

CNC Delta 100 Bender

1-Bend as per program D2580.C on CNC Bender and Folio FT009

2-Cut tubes as per Dwg. D2580

u 10/5/18

58501

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
120		0.00							
Skidtubes	Memo	0.00							
Skidtubes	1- Deburr ends								
	2- C'sink holes as per dwg without cutting fluid								
	3- Prepare tube for welding, remove alodine as required.								
	4- Scribe batch number insied aft end of tube.								
130	QC5- Inspect part completeness to step on W/O	0.00							
QC	Memo	0.00							
Quality Control									

1 11 015/18

① BE 10/05/18

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Page 3

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Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

140

0.00



Skidtubes

Memo

0.00

Skidtubes

1-Weld step D2576 as per Dwg. D2580 and QSI 004

A/R□□□ Aluminum Rod

m112860

BE 10/05/18

2-Prep per QSI 005 and weld crossbolt spacers D2579 as per Dwg. D2580, QSI 004.

For D2579 spacers, weld one side, pass 3/8" drill, weld other side, pass 3/8" drill

A/R□□□ Aluminum Rod

m112860

BE 10/05/18

3-Grind welds as per Dwg D2580 Grind flush ridge made from bending

4-Drill holes for wearplates using DT 8217 & DT8937 Open holes to 19/64", adjust stopper not to hit web. Debur

5-Counterbore crossbolt spacers to 7/16" ID x 1.0" deep as per Dwg D2580. Debur holes

6-Drill pilot holes for aft cap using DT 8215 Open holes to 0.208". Debur

7-Drill pilot holes for Tow ring using DT8091, open to .640" and Debur

m112860

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Page 4

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Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150 QC Quality Control	QC10- Inspect visual per QSI004- ground welds Memo	0.00 0.00	8/10/05/19						
160 QC Quality Control	QC5- Inspect part completeness to step on W/O Memo	0.00 0.00	8/10/05/19			70			
170 HandFinish Hand Finishing	Pressure Wash per QSI005 4.3 Memo Re-alodine tube as per QSI 005 section 4.1.2.1 do not acid etch and leave fwd cap out of solution.	0.00 0.00							1 6/10-5-20.

W/O:		WORK ORDER CHANGES					
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Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

180



Powdercoat

Powder Coating

White Gloss(Ref:4.3.5.1) per QSI005 4.3-Alum

114207

0.00

0.00

= 2.4 10/05/21

1 0

Memo

START TIME:

7:30pm

OVEN TEMPERATURE:

320°F

FINISH TIME:

8:00pm

190



QC

Quality Control

QC3- Inspect Part Finish

0.00

0.00

Memo

1 BR 10-5-25

W/O:		WORK ORDER CHANGES					
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May 7, 2010 2:26:59 PM



Page 6

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Cust Item ID:

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Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

200

0.00



HandFinish

Memo

0.00

Hand Finishing

1-Install inserts & wearplates & Gaskets as per Dwg. D2580. Use a drop of Sikaflex on insert holes before installing wearplates
A/R ☐ ☐ ☐ Sikaflex-291 *M 113435*
Sikaflex expire date: *10/11*

2-Coat D2594-3 O' rings with Petroleum Jelly and install on D2594-1 plugs as per Dwg D2580

3-Inspect for foreign object per QSI 024

4-Install 2855 Aft Cap as per Dwg D2580 and seal Fwd Step & Aft Cap with Sikaflex. Clean excess adhesive
A/R ☐ ☐ ☐ Sikaflex-291 *M 113435*
Sikaflex expire date: *10/11*

5-Wing Walk as per Dwg D2580 and QSI 005 4.4
Batch: *114432*

① BR 10-5-25.

W/O:		WORK ORDER CHANGES					
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May 7, 2010 2:26:59 PM



Page 7

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Customer:

Reference:

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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	----------------	--------------	--------------	---------------	---------------	------------------	----------------

210



QC

Quality Control

QC5- Inspect part completeness to step on W/O

0.00

S 10/05/26

0.00

Memo

Inspect Aft Cap, Fwd Step and Wing Walk of work to Current Step Inspect for Foreign objects per QSI 024

40

220



Packaging

Packaging

Packaging

0.00

Memo

Identify and pack for shipping as per PPPD205-634-041

Location: _____

PPP Rev: I

0.00

P 140/37 (1)

230



QC

Quality Control

QC21- Final Inspection - Work Order Release

0.00

Memo

0.00

10/06/01

MF
10-6-01

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Picklist Print

Tuesday, May 18, 2010 10:31:10 AM

Page 1

Work Order ID: 58501



Parent Item: D205-634-041



Parent Item Name: Replacement Skidtube

Start Date: 5/7/2010

Required Date: 5/24/2010

Comments: IPP Rev:N 02.08.28 FP was QC5 in Step 27; Added QC5 to Step 30 KJ
IPP Rev P 10.02.19 per PAR09-043 EC verified by:DD
IPP Rev. O 06.02.28 Added paperwork EC
IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Qty: 1.00

Required Qty: 1.00

D2580-1

Manufactured No

110

Each

6.0000

1



205 Skidtube bent detail



BS 3619 D M 10/5/18

Location

Loc Qty

Loc Code

LG

6

57028

1

58090

1

58112

2

58384

1

58385

1

D2576-3

Manufactured No

140

Each

105.0000

1



Step (maching detail)



Location

Loc Qty

Loc Code

LG

105

46661

57

52215

48

D2579

Manufactured No

140

Each

93.0000

20



Crossbolt Spacer



Location

Loc Qty

Loc Code

LG

93

57052

5

57348

88

20 BE 10/05/18

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IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Qty: 1.00

Required Qty: 1.00

D2855 Manufactured No 200 Each 102.0000 1



Cap

Location	Loc Qty	Loc Code
FP6	2	
56613	2	
ST026	100	
50513	1	
50770	28	
51539 ✓	17	
53791	54	

1 BR 10-5-25.

AN3-5A Purchased No 200 Each 957.0000 2



Bolt

Location	Loc Qty	Loc Code
ST350	957	
105057 ✓	957	

2 BR 10-5-25

AN960JD10L Purchased No 200 Each 4,199.000 2



Washer

Location	Loc Qty	Loc Code
ST348	4199	
110985 ✓	4199	

2 BR 10-5-25.

ALS7-1032-130 Purchased No 200 Each 17.0000 50



Insert

ALS7-1032-130

Location	Loc Qty	Loc Code
ST282	17	
114654	17	
113238	17	

50. BR 10-5-25.

Tuesday, May 18, 2010 10:31:10 AM

Shop Packet Print

Page 2

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 IPP Rev. O 06.02.28 Added paperwork EC
 IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Qty: 1.00

Required Qty: 1.00


AN3C4A Purchased No 200 Each 1,549.000 50

 BOLT

Location	Loc Qty	Loc Code
ST350	1549	
114103	501	
114108	300	
114416	12	
114523 ✓	736	

AN960C10L Purchased No 200 Each 0.0000 50

 washer
 D3566-13 Manufactured No 200 Each 30.0000 1

 Gasket

NAS 1149C0332R 114341

Location	Loc Qty	Loc Code
FP	30	
53461 ✓	30	

D3566-5 Manufactured No 200 Each 18.0000 1

 Gasket

Location	Loc Qty	Loc Code
FP015	18	
57682 ✓	18	

50 BR 10-5-25

50 BR 10-5-25

1 BR 10-5-25

1 BR 10-5-25

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Tuesday, May 18, 2010 10:31:10 AM

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IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM


Start Qty: 1.00

Required Qty: 1.00

D3566-1 Manufactured No 200 Each 35.0000 2

Gasket


Location	Loc Qty	Loc Code
FP015	35	
57715 ✓	14	
58182	21	

2 BL 10-5-25

D3564-11 Manufactured No 200 Each 6.0000 1

Wearshoe


Location	Loc Qty	Loc Code
FP019	6	
57957 ✓	6	

1 BL 10-5-25

D3564-13 Manufactured No 200 Each 24.0000 1

Wearshoe

Location	Loc Qty	Loc Code
FP17	24	
57684 ✓	10	
57922	14	

1 BL 10-5-25

D3564-9 Manufactured No 200 Each 19.0000 1

Wearshoe

Location	Loc Qty	Loc Code
FP	1	
55334	1	
FP019	18	
57685 ✓	4	
57958 ✓	14	

1 BL 10-5-25

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IPP Rev. O 06.02.28 Added paperwork EC
IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Qty: 1.00

Required Qty: 1.00

D3564-5

Manufactured No

200

Each

4.0000

1



Wearshoe

Location

Loc Qty

Loc Code

FG

1

34806

1

FP19

58709

3

57525

1

57729

2

1 Bk 10-5-25

D2594-3

Manufactured No

200

Each

359.0000

16



O-Ring, 205 Skidtube

Location

Loc Qty

Loc Code

FP

359

55546

19

58191 ✓

340

16 Bk Bk 10-5-25

D2594-1

Manufactured No

200

Each

534.0000

16



Plug, 205 Skidtube

Location

Loc Qty

Loc Code

FP

334

42807

112

55002

80

57826

142

FP14

200

58434 ✓

200

16 Bk 10-5-25

DART

DESIGN #	DRAWN BY BH	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED #	APPROVED #	DRAWING NO. D2580	REV. D SHEET 1 OF 3
DATE 07.02.27		TITLE 205 SKIDTUBE ASSEMBLY	SCALE NTS
A	96.09.16	NEW ISSUE	
B	96.12.02	AS MANUFACTURED	
C	98.08.26	REDRAWN, INCLUDED DEO 9094/9097	
D	07.02.27	CHANGE TO SS WEARPLATES AND GASKETS, INCLUDE DEO 9124/9183	

RELEASED
07-06-28 #

QTY -041	QTY -045	Part Number	Description
X		D2580-041	SKIDTUBE ASSEMBLY
	X	D2580-045	SKIDTUBE ASSEMBLY
1	1	D2500-1-190	EXTRUSION
1	1	D2576-3	STEP
20	24	D2579	CROSS BOLT SPACER
16	16	D2594-1	PLUG
16	16	D2594-3	O-RING
1	1	D2596	205 WEB
1	1	D2855	AFT CAP
1	1	D3564-5	WEARSHOE
1	1	D3564-9	WEARSHOE
1	1	D3564-11	WEARSHOE
1	1	D3564-13	WEARSHOE
2	2	D3566-1	GASKET
1	1	D3566-5	GASKET
1	1	D3566-13	GASKET
50	50	ALS7-1032-130 or AKS7-1032-130 or AKS4-1032-130 or AELS-1032-130	INSERT
50	50	AN3C4A	BOLT
2	2	AN3-5A	BOLT
50	50	AN960C10L	WASHER
2	2	AN960JD10L	WASHER

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 58501

B805-07

GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 2) ALL DIMENSIONS ARE IN INCHES
- 3) INSERT D2596 WEB TO LOCATION SHOWN OFF AFT END OF SKIDTUBE AND BOND WEB INTO OUTER TUBE WITH NON-STRUCTURAL SIKAFLEX-241 ADHESIVE PER DART QSI 015 BEFORE BENDING. ENSURE HOLES LINE-UP.
- 4) BEND AS A SMOOTH RADIUS STARTING WITH A MAXIMUM CENTERLINE RADIUS OF 60 AND ENDING WITH A MINIMUM RADIUS OF 30. A MAXIMUM REDUCTION OF 0.200 IN DIAMETER IS ALLOWABLE IN THE BENT PORTION OF THE TUBE.
- 5) USE DART DRILL TEMPLATE TD2577-205 TO LOCATE AND DRILL Ø0.297 HOLES FOR WEARSHOE INSERTS. INSTALL ALS7-1032-130 PER SECTION D-D (50 PLACES) AFTER FINISH. INSTALL AN3C4A BOLTS AND AN960C10L WASHERS WITH SIKAFLEX-241/-291.
- 6) WELDING TO BE DONE PER DART QSI 004.
- 7) FINISH:
SEE NOTES ON
PAGE 2 FOR D2580-041 AND
PAGE 3 FOR D2580-045
- 8) INSERT D2594-1 PLUG C/W D2594-3 O-RING IN HOLES MARKED 'P' (BOTH SIDES OF TUBE) AFTER FINISH (16 PLACES).

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RELEASED
07-06-28

Diagram illustrating the underside of the D2576-3 step, showing the location of the GRIND FLUSH (4 PLACES) and the LOCATION RIDGE ON UNDERSIDE OF D2576.

DRILL PRIOR TO D2855 CAP
INSTALLATION (2 PLACES)

SEAL WITH
SIKAFLEX-241/-291

AN3-5A BOLT (1)
AN960J10L WASHER (1)
(2 PLACES)

D2855 CAP

0.40

Diagram illustrating the assembly of a propeller hub, showing the following components and dimensions:

- D2579 SPACER**: The outer ring component.
- D2596 WEB (REF)**: The central web component.
- AL57-1032-130 (REF) (TYP 50 PLACES)**: The central bolt/nut assembly.
- 5**: A circled number indicating a quantity or count.

PERFORM THE FOLLOWING FOR #0.508 HOLES ONLY:

1. CHAMFER HOLE 0.050 X 45°
2. INSERT D2579 SPACER (20 PLACES)
3. WELD INTO PLACE AND GRIND FLUSH
4. C'BORE D2579 SPACER TO 0.437 X 1.00 DEEP

37.50
DISTANCE TO AFT END
OF D2598 WEB

3
7

1.750 1.750

Ø0.508 (TYP.)
(40 PLACES)

REFER TO DETAIL A

8.750 17.375 26.000 34.188 57.313 (REF)
7 EQUAL SPACES
8.188 PITCH

38.0 91.500 190.0
(D2500-1)

0.5 1.5 1.5 D

BLACK ANTI-SKID TO 0.5 ABOVE LOCATION RIDGE

BLACK ANTI-SKID TOP OF STEP TO 0.5 ABOVE BOTTOM EDGE

WELD AS PER DETAIL B

REFER TO DETAIL C

8

P P P P P P P

D3566-1 D3566-5 D3566-1 D3566-13

D3564-11 D3564-5 D3564-9 D3564-13

AN3C4A BOLT (1)
AN960C10L WASHER (1)
(50 PLACES)

DESIGN / DRAWN BY

i) FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB POWDER COAT ASSEMBLY GLOSS WHITE (REF. 4.3.5.1) PER DART QSI 005 4.3 BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4

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DART DART AEROSPACE LTD.
HAWKESBURY, ONTARIO, CANADA

DRAWING NO.	REV. D
D2580	SHEET 2 OF 3
TITLE	SCALE
205 SKIDTUBE ASSEMBLY	1:24

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

RELEASED
07-06-28

Diagram illustrating the underside of the D2576-3 step, showing grinding locations:

- GRIND FLUSH (4 PLACES)
- GRIND FLUSH
- D2576-3 STEP
- GRIND FLUSH
- LOCATION RIDGE ON UNDERSIDE OF D2576

Ø0.208

DRILL PRIOR TO D2855 CAP
INSTALLATION (2 PLACES)

SEAL WITH
SIKAFLEX-241/-291

AN3-5A BOLT (1)
AN960J10L WASHER (1)
(2 PLACES)

D2855 CAP

SEE NOTE 1)

0.40

0.003

The diagram shows a circular cross-section of a propeller hub. A central vertical shaft is labeled "D2579 SPACER". Two horizontal webs are labeled "D2596 WEB (REF)". The outer rim has two small rectangular features labeled "ALST-1032-130 (REF) (TYP 50 PLACES)". A dimension line indicates a distance of "5" from the centerline to one of these features.

AFTER DRILLING AND BENDING ASSEMBLY PERFORM THE FOLLOWING FOR #0.508 HOLES ONLY:

1. CHAMFER HOLE 0.050 X 45°
2. INSERT D2579 SPACER (20 PLACES)
3. WELD INTO PLACE AND GRIND FLUSH
4. C/BORE D2579 SPACER TO #0.437 X 1.00 DEEP

- i) FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB
POWDER COAT ENTIRE ASSEMBLY GREEN (REF. 4.3.5.8) PER DART QSI 005 4.3
BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4
- ii) IT IS ACCEPTABLE TO GRIND A RELIEF IN THE D2855 AFT CAP TO PREVENT INTERFERENCE
WITH THE SPACER AT THIS LOCATION

37.50
DISTANCE TO AFT END
OF D2598 WEB
3 7
1.750 1.750
0.508 (TYP.)
(40 PLACES)
REFER TO DETAIL E
REFER TO DETAIL A
8.750
17.375
26.000
34.188
57.313 (REF)
7 EQUAL SPACES
8.188 PITCH
38.0
91.500
190.0
(D2500-1)

Figure 1: Elevation view of the proposed road profile. The diagram shows a cross-section of a road with a centerline elevation of 90.508 (8 PLACES). Key dimensions include a 1.4m offset from the centerline to the left edge, a 5.985m offset to the right edge, and a 1.0m distance between the hole and the tangent point. The road width is 32.0 ± 1.0m. The profile is defined by a 51.340m segment, a 39.580m segment, and a 5.915m segment. A 1.0m distance is also indicated between the hole and the tangent point. The road is labeled "ROAD FROM DZ350-1 DRILLING DETAIL".

WELD AS PER DETAIL F

BLACK ANTI-SKID TO 0.5 ABOVE LOCATION RIDGE

BLACK ANTI-SKID TOP OF STEP TO 0.5 ABOVE BOTTOM EDGE

0.5

1.5

1.5

H

NO C'BORE NO PLUG

NO C'BORE NO PLUG

8

1.5

1.5

1.5

P

H

D3566-1

D3566-5

D3566-1

D3566-13

D3564-11

D3564-5

D3564-9


D3564-13

NO C'BORE NO PLUG

AN3C4A BOLT (1)

AN960C10L WASHER (1)

(50 PLACES)

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	CHECKED	APPROVED		DRAWING NO.	REV. D
	DATE			TITLE	SHEET 3 OF 3
	07.02.27			205 SKIDTUBE ASSEMBLY	SCALE 1:24

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

NO. 232

AWS D17.1.2001
QUALIFICATION TEST RECORD

Name: Barclay Elliott
Job number: 58508
Part number: D205 634 041
Description: 205 tube
Welding Process: Tig[☒] Mig[]
Base material: Aluminium
Current: AC[☒] DC[]

TEST REQUIREMENTS AND RESULTS

Visual: pass[☒] fail[]
Penetration: pass[☒] fail[]

UNACCEPTABLE

Cracks: pass[☒] fail[]
Undercut: pass[☒] fail[]
Pin holes: pass[☒] fail[]
Overlap (cold lap): pass[☒] fail[]
Porosity (surface): pass[☒] fail[]
Coloration: pass[☒] fail[]

Qualifier [Signature] Date of Test Coupon 10.05.18
Welder Barclay Elliott Date of Test Coupon 10.05.18

The above named individual is qualified in accordance with AWS D17.1.2001 to weld